

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-8 are pending in the present Application. Claims 1-2 and 6-8 are amended by the present amendment. Support for the amended claims can be found in the original specification, claims and drawings.¹ No new matter has been added.

In the Office Action, Claims 1-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over Coulson et al. (“A Statistical Basis for Longnormal Shadowing Effects in Multipath Fading Channels”, herein Coulson) in view of Zhao (“Multipath Propagation Characterization for Terrestrial Mobile and Fixed Microwave Communications,” herein Zhao I) and Zhao et al. (“Multipath Propagation Study Combining Terrain Diffraction and Reflection,” herein Zhao II).

As an initial matter, the undersigned appreciatively acknowledges the courtesy extended by Examiner Alhija in holding a personal interview with the undersigned on July 28, 2008. During the interview, a overview of the invention was presented, and proposed amendments to the claimed were discussed. No agreement was reached during the interview pending the submission of a formal response to the outstanding Office Action.

The Office Action rejected Claims 1-8 under 35 U.S.C. § 103(a) as unpatentable over Coulson in view of Zhao I and Zhao II. The Official Action asserts that Coulson discloses all of the Applicants’ claimed features with the exception of, when generating time-varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E_1 and E_2 that are electric field strengths of radio propagation paths diffracted by knife-edges, each of the radio propagation paths being diffracted at each of opposite ends of the shadowing object, respectively. The Official Action

¹ E.g., specification, at least at Fig. 12 and pp. 30-33.

cites Zhao I as describing this more detailed aspect of the Applicants' claimed advancements, with the exception of the "the radio propagation paths being diffracted at each of opposite ends of the shadowing object, respectively," instead relying on Zhao II for this claimed feature, and states that it would have been obvious to one of ordinary skill in the art at the time the advancements were made, to combine the cited references to arrive at Applicants' claims. In response to this rejection, Applicants respectfully submit that amended independent Claims 1-2 and 6-8 recite novel features clearly not taught or rendered obvious by the applied references.

Claim 1 recites, *inter alia*, a time-varying multi-path generating apparatus for simulating multi-path fluctuations in radio communications, wherein

... when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a ***received electric field strength E*** is given as the summation of ***E1 that is an electric field strength of a first radio propagation path diffracted by a knife-edge at one edge of the shadowing object*** and ***E2 that is an electric field strength of a second radio propagation path that is different from the first propagation path and diffracted by a knife-edge at another opposite edge of the shadowing object.***

Independent Claims 2 and 6-8, while directed to alternative embodiments, are amended to recite similar features. Accordingly, the remarks and arguments presented below are applicable to each of amended independent Claims 1-2 and 6-8.

As admitted at pp. 4-5 of the Office Action, the combination of Coulson and Zhao I fails to disclose that a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths, "the radio propagation paths being diffracted at each of opposite ends of the shadowing object, respectively." Therefore, it follows that the combination of Coulson and Zhao I fail to disclose the more detailed features directed to the plurality of propagation paths, being diffracted by knife-edges at opposite edges of the shadowing object, as recited in amended independent Claim 1.

In an attempt to remedy the above noted deficiency, the Office Action relies on pp. 1204-1205 and Figs. 2a/2b of Zhao II, asserting that this reference “discloses edges at the opposite ends of the shadowing object.”

Zhao II describes a method for deriving a multiple knife-edge attenuation formula by combining diffraction and ground reflection. As described in section III on p. 1205 with reference to Figs. 2a/b, for example, Zhao II describes that each of the knife edges are defined as the mean diffraction at one end of a first shadowing object and at a second end of a second shadowing object, and so on. More particularly, in the “Response to Arguments” portion of the Office Action, Fig. 2a of Zhao II is shown, and the Office Action asserts that “[t]he interval $x_1 \dots$ contains the shadowing object H1 which shows the opposite ends of the shadowing object...” However, H1 in Fig. 2a shows a plurality of radio propagation paths resulting from diffraction at a single “Point of object”, as noted in the Office Action.

Therefore, the knife edges, as defined in Zhao II, each represent only a single diffraction at one point of a shadowing object, and not diffraction of two different propagation paths at different opposite ends of a shadowing object, as claimed. Thus, Zhao II fails to teach or suggest that a “received electric field strength E is given as the summation of E_1 that is an electric field strength of a first radio propagation path diffracted by a knife-edge at one edge of the shadowing object and E_2 that is an electric field strength of a second radio propagation path that is different from the first propagation path and diffracted by a knife-edge at another opposite edge of the shadowing object,” as recited in amended independent Claim 1.

Further, during the interview, Examiner Alhija requested how the claimed features directed to the plurality of radio propagation paths differed from the double knife edge, or multiple knife edges, described in Fig. 1 of Zhao II. Fig. 1 of Zhao II describes an equation (1) by which a multiple knife-edge diffraction field with ground reflection can be obtained.

However, the method only considers a situation in which only a ground reflected signal is incident on the multiple knife-edge surface. Thus, a single signal is considered to be incident on both knife-edges, and the method of Zhao II fails to consider the situation in which each of a first radio propagation path, and a second radio propagation path are diffracted by different knife-edges of the shadowing object, as claimed.

More particularly, in an exemplary embodiment, Fig. 12 of the present specification shows that E1 results from a first propagation path diffracted at a first knife-edge (x_1, y_1) of the shadowing object, and E2 results from a second propagation path diffracted at a second knife-edge (x_2, y_2) of the shadowing object. A received signal strength E at the receiving station is then calculated as a sum of E1 and E2. Fig. 1 of Zhao II, on the other hand, merely describes calculating the “field relative to free space at the receiving point” by considering what appears to be the reflected components of a ground reflected signal on the flat-topped obstacle shown in Fig. 1.

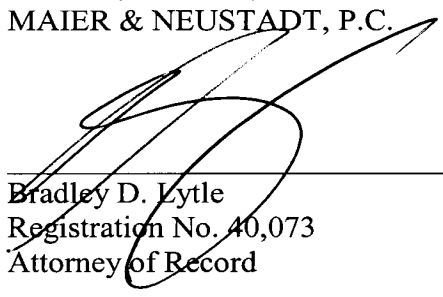
Thus, Zhao II, neither alone, nor in combination with Zhao I and Coulson, discloses determining a received electric field strength as a summation of “an electric field strength of a first radio propagation path diffracted by a knife-edge at one edge of the shadowing object” and “an electric field strength of a second radio propagation path that is different from the first propagation path and diffracted by a knife-edge at another opposite edge of the shadowing object,” as recited in amended independent Claim 1.

Accordingly, Applicants respectfully request the rejection of Claims 1-8 under 35 U.S.C. § 103 be withdrawn.

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that the present application, including Claims 1-8, is patentably distinguishing over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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